What is claimed is:

1. A method for adjusting the responsiveness of a rate-adaptive pacemaker operating in a patient, wherein measured minute ventilation values in the patient are mapped to a pacing rate by a dual-slope rate response curve, comprising:

measuring minute ventilation values and determining that an average of those minute ventilation values are increasing, signifying that the patient's exertion level is increasing;

determining an amplitude of an oscillatory component in the measured minute ventilation values to be above a specified threshold value; and,

if the amplitude of the oscillatory component falls below the specified threshold value as the average minute ventilation continues to increase, setting the breakpoint of the rate response curve equal to the presently measured minute ventilation value.

2. The method of claim 1 wherein the measured minute ventilation values are passed through a high pass filter to determine the oscillatory component.

3. The method of claim 2 wherein the oscillatory component is in an approximate frequency range between .01 and .05 Hz.

4. A method for operating a pacemaker in a patient, comprising:

sensing ventricular depolarizations and resetting a ventricular escape interval upon each ventricular sense;

delivering paces to a ventricle such that a ventricular pace is delivered upon expiration of the ventricular escape interval, the reciprocal of the ventricular escape interval being the lower rate limit of the pacemaker;

measuring minute ventilation values corresponding to the exertion level of the patient;

determining if an amplitude of an oscillatory component in the measured minute ventilation values is above a specified threshold value;

if the amplitude of the oscillatory component is below the specified threshold value, adjusting the lower rate limit in accordance with the measured minute ventilation value; and,

if the amplitude of the oscillatory component is above the specified threshold, cross-checking the measured minute ventilation value with a measured activity level before adjusting the lower rate limit.

5. A method for operating a pacemaker in a patient, comprising:

sensing depolarizations from both ventricles;

pacing both ventricles in accordance with a ventricular resynchronization pacing mode;

measuring minute ventilation values corresponding to the exertion level of the patient; and,

determining if an amplitude of an oscillatory component in the measured minute ventilation values is above a specified threshold value.

6. The method of claim 5 further comprising transmitting an indication of the amplitude of the oscillatory component to an external programmer.

7. The method of claim 5 further comprising adjusting an operating parameter of the pacemaker if the amplitude of the oscillatory component in the measured minute ventilation values is above a specified threshold value.

8. The method of claim 7 wherein the adjusted operating parameter is an atrio-ventricular interval.

9. The method of claim 7 wherein the adjusted operating parameter is a biventricular offset interval.

10. A rate-adaptive pacemaker, comprising;

sensing and pacing channels for sensing cardiac depolarizations and delivering paces to a selected chamber;

a minute ventilation sensor,

a controller for controlling the delivery of paces in accordance with a pacing mode at a programmed pacing rate, wherein measured minute ventilation values in the patient are mapped to a pacing rate by a dual-slope rate response curve;

wherein the controller is configured to determine if an amplitude of an oscillatory component in the measured minute ventilation values is above a specified threshold value and, if the amplitude of the oscillatory component falls below the specified threshold value as the average minute ventilation continues to increase, to set the breakpoint of the rate response curve equal to the presently measured minute ventilation value.

11. The pacemaker of claim 10 further comprising a bandpass filter for extracting the oscillatory component from the measured minute ventilation values.

12. The pacemaker of claim 10 wherein the filter has a passband in an approximate frequency range between .01 and .05 Hz.

13. A rate-adaptive pacemaker, comprising:

sensing and pacing channels for sensing cardiac depolarizations and delivering paces to a selected chamber;

a minute ventilation sensor,

a controller for controlling the delivery of paces in accordance with a pacing mode at a programmed pacing rate, wherein measured minute ventilation values in the patient are mapped to a pacing rate by a rate response curve;

wherein the controller is programmed to determine if an amplitude of an oscillatory component in the measured minute ventilation values is above a specified threshold value and, if the amplitude of the oscillatory component is below the specified threshold value, to adjust the lower rate limit in accordance with the measured minute ventilation value and, if the amplitude of the oscillatory component is above the specified threshold, to cross-check the measured minute ventilation value with a measured activity level before adjusting the lower rate limit.

14. A pacemaker, comprising:

sensing channels for sensing depolarizations from both ventricles;

pacing channels for delivering paces to both ventricles;

a minute ventilation sensor;

a controller for pacing the ventricles in accordance with a ventricular resynchronization pacing mode; and,

wherein the controller is configured to measure minute ventilation values corresponding to the exertion level of the patient and to determine if an amplitude of an oscillatory component in the measured minute ventilation values is above a specified threshold value.

15. The pacemaker of claim 14 further comprising a telemetry interface for transmitting an indication of the amplitude of the oscillatory component to an external programmer.

16. The pacemaker of claim 14 wherein the controller is configured to adjust an operating parameter of the pacemaker if the amplitude of the oscillatory component in the measured minute ventilation values is above a specified threshold value.

17. The pacemaker of claim 16 wherein the operating parameter adjusted by the controller is an atrio-ventricular interval.

18. The pacemaker of claim 16 wherein the operating parameter adjusted by the controller is a biventricular offset interval.

19. The pacemaker of claim 16 wherein the operating parameter adjusted by the controller is a pacing configuration that determines which pacing channels are to be used for pacing.

20. The pacemaker of claim 16 wherein the operating parameter adjusted by the controller is a rate-adaptive pacing parameter.